

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD
UNIVERSITY OF MALTA, MSIDA

SECONDARY EDUCATION CERTIFICATE LEVEL

MAY 2017

SUBJECT:	Engineering Technology
PAPER NUMBER:	Controlled – Unit 2
DATE:	29 th May 2017
TIME:	10:00 a.m. to 11:35 a.m.

**THIS PAPER SHOULD BE RETURNED TO THE INVIGILATOR
AFTER THE EXAMINATION.**

Name of candidate _____

I.D. number _____

School _____

Class _____

Answer **ALL** questions.

Scenario

A local manufacturing company is interested in expanding its operations. In view of this the company is interested in recruiting several engineering officers. As part of the interview, the management is determining whether candidates applying for the posts are skilled in the area of materials and processes used to work and form such materials for the industrial market. Answer questions 1 to 8 to demonstrate that you are a suitable candidate for a post within this local manufacturing company.

Question 1

K4 (4 marks)

Smart materials are able to change their properties when externally stimulated. In Table 1 below list **FOUR** types of smart materials and describe their function.

Table 1 – Smart Materials

	Smart Material Type	Function
(a)		
(b)		
(c)		
(d)		

(4)

Question 2

C2 (6 marks)

Manufacturing processes are required to produce goods made up of different materials.

(a) Galvanising is a very important process used around the world in manufacturing of specific goods.

(i) Mention **ONE** type of material that requires galvanising. Give **ONE** reason for your answer.

(1½)

(ii) Explain a typical galvanising process by including **THREE** important steps.

(1½)

(b) Injection Moulding is another important process used in manufacturing.

(i) For which type of material is Injection Moulding used?

(1)

(ii) Explain briefly a typical Injection Moulding process by including **FOUR** important steps.

(2)

Question 3

K5 (4 marks)

Different tests can be carried out on materials to determine their properties and current conditions. Fill in the second column of Table 2 by outlining how each particular test is carried out. The first one has been done for you.

Table 2 – Tests carried out to measure material properties.

	Property being Measured	Procedure to Test Property
	Impact	The material to be tested is placed in an impact tester after a notch is cut in one side. A pendulum is raised to a known height and allowed to fall. As the pendulum swings it impacts the test material. The failure mode is then examined.
(a)	Temperature of liquid or gas	
(b)	Hardness	
(c)	Compression	
(d)	Tensile Strength	



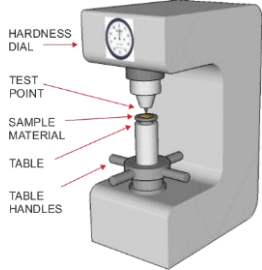


(4)

Question 4

C3 (6 marks)

Various tests are used when selecting appropriate materials to use in particular situations. Fill in Table 4 by choosing tests listed in Table 3. The first row of Table 4 has been done for you.

Table 3 – Tests used when selecting materials to use in a particular scenario.

Tests	Type of test
	A
	B
	C
	D
	E

This question continues on the next page.

Table 4 – Scenarios for which testing is required

Scenario	Test	Testing Equipment	Procedure and justification of Testing equipment used.
Lightweight material is required to build a boat. Four materials with necessary properties are available. You need to select the one to use.	A	Electronic Balance	The material is measured to calculate the volume. It is then placed on a balance and the weight is read off the balance. The density of the material is then calculated. It can then be established which is the lightest material, to use in the boat building.
A bearing in which a metal is rubbing with another needs to be constructed. The proper materials which are able to last for a long time need to be selected.			
The temperature of a chemical needs to be tested before two chemicals are mixed with each other.			
The concrete poured in a construction site needs to be selected to ensure that it is strong enough to support the building's load.			
The material used to manufacture the wire rope for a crane needs to be selected. Four sample materials are available.			

Question 5**K6 (4 marks)**

Different materials are available in different forms of supply. Fill in Table 5 to identify **FOUR** forms of supply for each particular type of material. An example has been done for you.

Table 5 – Forms of Supply

Type of material	Form of supply 1	Form of supply 2	Form of supply 3	Form of supply 4
Metals	Bars	Sheets	Pipe	Wire
Woods				
Polymers				

(4)

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Question 6

K9 (4 marks)

Technicians and operators in a workshop make use of several power tools and machinery for different tasks. Hence, it is important for them to recognise tools and understand their functions.

Complete Table 6 by filling in the name and **ONE** respective function of tool / machinery. The first one has been done for you.

Table 6 – Functions of Tool/Machinery

Tool / Machinery	Name	Function
	Cordless Drill	A cordless drill is used to drill holes in masonry without the need of a power cable connection. This type can also be used as a hammer chisel on concrete walls.
		
		
		
		

(4)

Question 7

K10 (4 marks)

Tools are essential when conducting engineering work and need to be used appropriately and maintained to last longer.

(a) Marking out tools are an important group of tools. Answer the questions below on marking out tools.

(i) Why are marking out tools used?

(1)

(ii) Mention **TWO** marking out tools which are used for sheet metal work.

(1)

(b) Describe how a power tool such as an electric drill should be taken care of, to ensure that it lasts longer. In your answer mention **TWO** points which should be considered.

(2)

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